

WHAT IS CLAIMED IS:

1. An OLED display system, comprising:
 - a) an OLED display including an array of light emitting pixels,
5 each pixel having a plurality of OLEDs for emitting different colors of light specifying a gamut and including at least one additional OLED within the gamut defined by the other OLEDs and wherein one of the OLEDs has a power efficiency or lifetime different from the power efficiency or lifetime of at least one of the other OLEDs;
 - 10 b) a control signal; and
 - c) a display driver for receiving a color display signal representing a relative luminance and color to be produced for each pixel of the display and generating a converted color display signal for driving the OLEDs in the display at the relative luminance and color, wherein the display driver is responsive to the control signal for controlling the in-gamut mixing ratio of the OLEDs to reduce power consumption or increase lifetime of at least one of the OLEDs.
2. The OLED display system claimed in claim 1, wherein the control signal is dependent upon the image content of the color display signal, and
20 wherein the display driver controls the in-gamut mixing ratio of the converted color display signal in proportion to the image content of the color display signal.
3. The OLED display system claimed in claim 1, wherein the control signal is dependent upon the age of the OLED display, and wherein the display driver controls the in-gamut mixing ratio of the converted color display signal in proportion to the age of the OLED display.
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4. The OLED display system claimed in claim 1, further comprising a user interface control that allows a user to select a tradeoff between power usage and in-gamut mixing ratio of the OLED display.
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5. The OLED display system claimed in claim 1, wherein the display driver limits the in-gamut mixing ratio of the OLED display within a range having some minimum and/or maximum value.
6. The OLED display system claimed in claim 1, wherein the OLED display includes OLEDs having materials that emit different colors of light including at least one of the group including red, green, blue, and white.
7. The OLED display system claimed in claim 1, wherein the 10 OLED display includes OLEDs that emit white light and are overlaid with color filters.
8. The OLED display system claimed in claim 7, wherein the color filters include at least one of the group including red, green, and blue.
- 15 9. The OLED display system claimed in claim 1, wherein the in-gamut OLED emits white light.
10. The OLED display system claimed in claim 1, wherein the 20 display driver further changes the in-gamut mixing ratio as a function of the brightness of the OLED display.
11. A method of driving an OLED display, comprising the steps of:
 - 25 a) providing an OLED display including an array of light emitting pixels, each pixel having a plurality of OLEDs for emitting different colors of light specifying a gamut and including at least one OLED within the gamut defined by the other OLEDs and wherein the power efficiency of the in-gamut OLED is higher than the power efficiency of at least one of the other OLEDs;
 - 30 b) generating a control signal;
 - c) receiving a standard color image signal representing a relative luminance and color to be produced for each pixel of the OLED display and

generating a converted color image signal in response to the control signal to control the in-gamut mixing ratio of the display; and

d) driving the OLED display with the converted color image signal.

5 12. The method claimed in claim 11, wherein the control signal is dependent upon the image content of the color display signal, and wherein the display driver controls the in-gamut mixing ratio of the converted color display signal in proportion to the image content of the color display signal.

10 13. The method claimed in claim 11, wherein the control signal is dependent upon the age of the OLED display, and wherein the display driver controls the in-gamut mixing ratio of the converted color display signal in proportion to the age of the OLED display.

15 14. The method claimed in claim 11, further comprising a user interface control and wherein the user interface control allows a user to select a tradeoff between power usage and in-gamut mixing ratio of the OLED display.

20 15. The method claimed in claim 11, wherein the display driver limits the range of the in-gamut mixing ratio of the OLED display within some minimum and/or maximum value.

16. The method claimed in claim 11, wherein the OLED display includes OLEDs having materials that emit different colors of light.